GRAND CANYON NATIONAL PARK
DRAFT WILDERNESS MANAGEMENT PLAN

ENVIRONMENTAL ASSESSMENT

I. INTRODUCTION

Purpose and Need for the proposed Wilderness Management Plan

National Park Service Management Policies (Chapter 6:4) requires the superintendent of each park containing wilderness to develop and maintain a wilderness management plan to guide the preservation, management, and use of that wilderness. The term "wilderness" applies to proposed wilderness, as in Grand Canyon National Park, as well as designated wilderness (Special Directive 95-2). Both Grand Canyon National Park's General Management Plan (p. 57) and Resource Management Plan (p. 165) require revision of the 1988 Backcountry Management Plan in a manner consistent with wilderness management.

This environmental assessment provides an analysis of the environmental and social impacts of the Draft Wilderness Management Plan "proposed action" and a "No Action" alternative for responding to management issues within the proposed wilderness of Grand Canyon National Park. Impacts of projects, such as road reclamation, trail restoration, and implementation of the minimum requirement process are analyzed. Additional environmental assessments will be completed where more site-specific analyses are warranted.

Relationship to Statutes, Regulations and Other Plans

There are three laws that constitute the primary authorities for administration of the National Park Service. Under the 1916 National Park Service Organic Act, the National Park Service (NPS) is charged with management of the parks to "…conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations."

The General Authorities Act of 1970 defined the National Park System as including all the areas administered by the NPS "…for park, monument, historic, parkway, recreational, or other purposes," and declared that all units in the "System will be managed in accordance with their respective individual statutory directives, in addition to the Congressional direction found in the Organic Act and other relevant legislation, providing the general legislation does not conflict with specific provisions."

In 1978, in the Act expanding Redwood National Park, NPS general authorities were further amended to specifically mandate that all park units be managed and protected "in light of the high public value and integrity of the National Park System" and that no activities should be undertaken "in derogation of the values and purposes for which these various areas have been established," except where specifically authorized by law.

NPS policy originates in law, and must be consistent with these higher authorities and with appropriate delegations of authority. The proposed actions addressed in this environmental assessment are consistent with *NPS Management Policies* regarding the preservation and management of wilderness in national parks. These policies are based on the Wilderness Act of 1964 which defines wilderness as "an area of undeveloped federal land retaining its primeval character and influence, without permanent improvements or human habitation." The 1980 Grand Canyon Final Wilderness Recommendation, updated in 1993, defines the area of proposed wilderness and provides the basis for initiating subsequent actions necessary for maintaining or restoring wilderness suitability. The proposed Wilderness Management Plan also conforms with the goals and objectives specified in the 1995 Grand Canyon General Management plan and the 1997 Grand Canyon Resource Management Plan, as well as the procedures and guidelines outlined in NPS 77: Natural Resources Management Guideline and NPS 2: Planning Process Guideline.

Cultural resource management conforms with a variety of legislation including the Antiquities Act of 1906, the Historic Sites Act of 1935, the National Historic Preservation Act of 1966 (as amended 1992), the Archaeological and Historic Preservation Act of 1974, the Archaeological Resources Protection Act (ARPA) of 1979 (as amended 1988), the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, and the 1996 Executive Order 13007 Indian Sacred Sites (EO 13007). All actions presented in the proposed action are consistent with *NPS Management Policies* (Chapter 5) regarding cultural resources management.

This environmental assessment complies with the National Environmental Policy Act of 1969 as it provides the decision-maker with alternatives for managing the proposed wilderness in Grand Canyon National Park. It also describes the environmental impacts and consequences of implementing each alternative.

II. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

ALTERNATIVE A: IMPLEMENT THE WILDERNESS MANAGEMENT PLAN (PROPOSED ACTION)

This alternative provides guidance for meeting legislative and policy mandates on wilderness management while providing recreational opportunities consistent with wilderness. It provides for implementation of goals and objectives specified in Grand Canyon National Park's 1995 General Management Plan and the 1997 Resource Management Plan. The proposed alternative provides means of protecting and restoring wilderness suitability for lands identified in the Final Wilderness Recommendation. This alternative provides for a sequence of management actions necessary for effective and consistent wilderness management, including recreational opportunities for a broad range of visitor experiences and settings, while preserving and protecting the natural, cultural, and social resources of Grand Canyon National Park wilderness.

Natural Resources

Restoration

This alternative calls for the development and implementation of action plans that:

- establish designated campsites and rehabilitate impacted areas in the Deer Creek, Cape Final, Point Sublime, Fire Point, Swamp Point, and Pasture Wash Use Areas
- rehabilitate campsites and trails in the Horseshoe Mesa, Hermit Creek, Monument Creek, and Upper Tapeats Use Areas
- restore to a natural condition two primitive roads north of New Water Springs on "the Hook" section of the extreme western Park
- relocate 1.4 miles of trail across the Basin and restore to natural conditions the Basin section of the old W-1 primitive road on the North Rim
- rehabilitate rim access trails including: Tanner, New Hance, South Bass, South Canyon, and Nankoweap
- restore to a natural condition approximately 40 miles of primitive roads on the Kanab Plateau
- restore to a natural condition the Tuweep landfill and its one-mile access road
- restore to a natural condition the two-mile Vulcan Spur Road in Toroweap Valley
- restore the Huitzal spur road at Pasture Wash

The action plans implementing the above projects may require additional environmental and cultural consultations as required under the National Environmental Policy Act (NEPA), the Endangered Species Act, and the National Historic Preservation Act.

Visitor Use and Education

This alternative:

- establishes and implements a permit system that serves the visitor by providing the opportunity to obtain permits for wilderness and nonwilderness areas that yield the type of experience they seek
- establishes a coordinated interpretive/educational program to provide hikers adequate information for planning and executing an enjoyable and safe expedition, whether hiking for a day or for an extended period, and to conduct themselves in a manner not damaging to wilderness resources and values
- establishes a coordinated, interagency wilderness educational program for Park staff including 1) wilderness management principles and philosophy, 2) Leave No Trace training, 3) application of the minimum requirement concept, 4) development of proficiency in the use of primitive tools, 5) development of minimum-impact trail maintenance techniques and fire suppression tactics, and 6) development of wilderness safety practices
- provides, through partnerships with adjacent land-managing agencies, information on wilderness and nonwilderness recreational opportunities on adjacent lands, including National Forest Service, Bureau of Land Management, State, and Tribal lands.

Semi-Primitive Access

This alternative retains ten primitive roads to provide mechanized access to wilderness trailheads and scenic vistas, as specified in the Final Wilderness Recommendation. It also establishes minimal standards for primitive road maintenance.

This alternative establishes the Semi-Primitive Mechanized Opportunity Class to describe conditions and standards for nonwilderness primitive road corridors. This is a modified version of the Forest Service's Semi-Primitive Motorized Recreation Opportunity Spectrum classification (USDA Forest Service 1982) and constitutes a separate "Opportunity Class." The Semi-Primitive Mechanized Opportunity Class requires that 1) the area remains predominantly natural in appearance, 2) the interaction between users is low, 3) camping is permitted only in designated sites, 4) wilderness group-size limits apply, and 5) mechanized use, including bicycles, is permitted.

Stock Use

This alternative provides for stock use on six rim wilderness trails and one (Whitmore) inner canyon wilderness trail. The management of the Bright Angel, North Kaibab and South Kaibab Trails is addressed in the 1988 Backcountry Management Plan. That document remains the primary management plan for the Cross-Canyon Corridor until replaced with an updated plan.

Safety

This alternative provides a reasonable level of public safety, consistent with *NPS Management Policies* and Park guidelines on wilderness, by:

- distributing an educational video to the Visitor Contact stations, permit holders, and interested groups
- establishing a coordinated public Interpretive Program which provides relevant, pre-trip information focused on wilderness values, personal safety, and resource protection

Trails

This alternative provides access consistent with wilderness values, including protection of natural and cultural resources. It defines criteria for preserving the character of 63 individual trails. It also provides for the conversion of approximately 80 miles of primitive roads to trails for recreational and administrative use. Proposed actions include developing and implementing action plans that establish trails on former road alignments:

- the nine-mile Brady Hollow Trail on Tuckup Point
- seven (approximately 40 miles) former North Rim fire roads, including Tiyo Point, Widforss, Komo Point, Francois Matthes, Walhalla Glades, Walhalla Spur, and most of the W-1 (the Basin) fire roads
- the “Cove Trail” on the old, ten-mile road from the Tuweap Road to the Cove area
- a one-mile section from the Park boundary to “Fort Garrett,” an obscure historic

foundation on the Sanup Plateau
- a one-mile section from the Park boundary to Fire Point
- a 9.6-mile trail on the old road alignment from Desert View to Cape Solitude-the ten-mile Kanab Plateau Trail connecting Kanab Point with the 150 Mile Canyon Road.

This alternative also provides for upgrading the Old Bright Angel Trail from a route to primitive trail standards.

Monitoring

This alternative establishes indicators and standards for desired visitor experiences and biophysical and cultural resources. It requires regular interdisciplinary monitoring, evaluation, and assessment of conditions presented by indicators, and requires management action necessary to meet these standards. This alternative provides for the:

- continuing the Rapid Campsite Assessment methodology for campsite monitoring
- establishing a monitoring schedule based on use statistics and trend information
- conducting of baseline campsite inventory in newly created Use Areas
- completing the inventory in Wild Use Areas
- implementing a monitoring program based on sociological research and previous monitoring programs, with the focus on users in wilderness areas
- establishing a Semi-Primitive Mechanized Opportunity Class to describe conditions and standards for nonwilderness primitive road corridors.

Water Quality

This alternative provides for water quality and flow data monitoring at wilderness destinations and potential areas of impact on a cyclic basis. It also provides for an inventory of all tributary streams to quantify flow data and riparian vegetation.

Cultural Resources

This alternative calls for:

- determination of National Register of Historic Places eligibility for the Santa Maria Springs Shelter, Signal Hill Firetower, Kanabownits Cabin, and the Kanabownits Firetower. Upon completion of this process a course of action will be determined
- implementation of archeological surveys and monitoring along popular trails and campsites in the Grandview Complex, Hermit–Monument Complex, Thunder River–Deer Creek Use Areas
- development and implementation of a site data recovery plan for archeological sites located in the Hermit Creek, Monument Creek, Horseshoe Mesa, Cottonwood Creek, Clear Creek, Cremation, and Tanner Use Areas
- restoration of historic trails in Hermit, Clear Creek, Grandview, and Thunder River–Deer Creek Complexes
- continuation of survey, assessment, monitoring, and when necessary, mitigation of problem segments of other wilderness trails.

Research

This alternative encourages research to increase understanding of Park environments and to contribute to the body of knowledge required for effective management and protection of wilderness resources and values. Proposed actions include:

- evaluate the tools and methods of scientific study for their impacts on wilderness character. Take reasonable efforts to minimize impacts while maximizing the benefit of scientific investigations by applying the minimum requirement decision process
- expand the Park's research program to obtain accurate information about the Grand Canyon's resources, ecological processes and human influences.

Proposed Partnerships

Wild and Scenic Rivers Designation

Develop, through partnerships with institutes of higher learning and conservation organizations, methods for determining suitability of the Colorado River and its tributaries for inclusion in the National Wild and Scenic Rivers System. This may include conducting water quality and flow data monitoring at wilderness destinations on a cyclic basis, as well as conducting an inventory of all tributary streams to quantify flow data and riparian vegetation.

Ecosystem Management

Develop, through partnerships with adjacent land-management agencies, conservation organizations, and institutes of higher learning, an interagency ecosystem-management strategy. The strategy will emphasize restoration and maintenance of natural processes and viable populations of all native species in natural patterns of abundance and distribution. These partnerships will require development of strategies and programs to:

- maintain long-term viable carnivore populations
- address the control of nonnative plant and animal species
- facilitate the design and implementation of studies for the reintroduction of extirpated species
- facilitate the design and implementation of a wildlife conservation strategy

Develop, through partnerships with adjacent land-management agencies, information on wilderness and nonwilderness recreational opportunities on adjacent lands, including National Forest Service, Bureau of Land Management, State, and Tribal lands.

Administrative

This alternative serves Park management by providing:

- continuity of wilderness management throughout changes of park administration and

staff
- specific direction for revising other Park management plans consistent with the wilderness management requirements
- effective ways to educate the public on low-impact practices, ethics, and safety
- data on hiker use levels and distribution in order to make informed decisions regarding the management and protection of backcountry and wilderness resources
- recommended Park staffing levels to ensure that wilderness management responsibilities are being met in accordance with the NPS Wilderness Management Guidelines.

This alternative directly addresses the "minimum requirement concept" for administrative use in Grand Canyon National Park. The minimum requirement consists of the minimum tool or administrative practice necessary to successfully and safely accomplish management objectives with the least adverse impact on wilderness character and resources. *NPS Management Policies* clearly states that "all decisions pertaining to administrative practices and use of equipment in wilderness will be based on this concept."

Actions Deferred to Other Plans

The Fire Management Plan revision will address 1) the restoration of the natural fire regime in wilderness areas, 2) the protection and preservation of genetic integrity, and 3) strategies for restoration, enhancement and protection of threatened or endangered species.

The Colorado River Management Plan revision will address implementing wilderness management requirements and strategies within the "proposed potential" wilderness river corridor.

The 1988 Backcountry Management Plan will remain the primary management plan for the nonwilderness Cross-Canyon Corridor (Phantom Ranch, Bright Angel Trail, and North and South Kaibab Trails) until replaced by an updated plan.

ALTERNATIVE B: NO ACTION

This alternative provides management actions based on the 1988 Backcountry Management Plan. The No Action alternative does not provide guidance for meeting legislative and policy mandates on wilderness management, nor does it provide for implementation of wilderness goals and objectives specified in Grand Canyon National Park's 1995 General Management Plan or the 1997 Resource Management Plan. This alternative lacks the means of protecting and restoring wilderness suitability for lands identified in Grand Canyon's Final Wilderness Recommendation. It fails to provide a sequence of management actions necessary for effective and consistent protection and restoration of wilderness values.
The 1988 Backcountry Management Plan served primarily as an operational plan for visitor use management and many of its features are included in the proposed alternative. The primary features of the 1988 plan are: 1) use of a permit and reservation system for all overnight use of the Park's backcountry (Cross-Canyon Corridor included), 2) division of backcountry lands into use areas, 3) classification of each use area into four management

zones, 4) establishment of visitor use limits for each use area, 5) establishment of research and monitoring programs intended to assist management in achieving management objectives, and 6) implementation of actions intended for mitigation of impacts exceeding established standards.

The goals presented in the 1988 plan are: 1) to maintain and perpetuate the natural ecosystem processes within the Park, 2) to protect and preserve historic and prehistoric cultural resources, and 3) to provide and promote a variety of backcountry recreational opportunities compatible with resource protection and visitor safety.

This alternative continues the reservation and permit system and establishes visitor use limits based upon sociological research and monitoring, and mitigation measures for non-attainment of resource and experiential standards.

This alternative continues a limited information and education program, relying primarily on the Backcountry Reservations Office (now the Backcountry Office) and ranger patrol contacts.

III. AFFECTED ENVIRONMENT

Location

Grand Canyon National Park is located on 1,218,376 acres of the Colorado Plateau in northwestern Arizona within Coconino and Mohave Counties. The raised plateaus of the South and North Rims are separated by the deeply cut drainage system of the Colorado River and its tributaries.

Climate

Climatic conditions in the Grand Canyon region are diverse and elevation-based. Most of the region is arid to semi-arid, although some of the higher elevations can be moderately moist. Overall, the climate of the South Rim is typical of the southwestern United States, being somewhat dry and generally pleasant. Most precipitation comes from summer thunderstorms originating in moist air masses moving in from the south, and from winter weather systems originating in cold, moist air masses from the northern Pacific Ocean. Heavy rains producing spectacular floods occasionally result from tropical moisture in the fall and winter. Spring and fall are usually dry, although a defining characteristic of Grand Canyon weather is its variability.

Annual precipitation is between 14 and 16 inches on the South Rim, more than 25 inches on the North Rim, and less than 10 inches in the inner canyon. Low humidity and high summer temperatures cause high evapo-transpiration rates. Summer thunderstorms usually occur from early July through August and often contain lightning. Snow is possible from late October through April, but deep and persistent accumulations are rare on the South Rim. At the highest elevations on the North Rim, more than 150 inches can fall, closing the entrance road from early November until mid-May. Summer temperatures can reach 98^{o} F

on the rim, and 120° F along the river; winter temperatures can drop to -20° F or more. The frost-free period ranges from 101 days on the North Rim to 148 days on the South Rim. The prevailing wind for most of the year is from the southwest.

Soils

Soils tend to be shallow and poorly developed, but stable with frequent rock outcroppings. The only exceptions are moderately deep soils in stable valley bottoms of both rims, generally indicated by meadows and sage flats. Soil development on the rim is influenced predominantly by the Permian Kaibab Limestone Formation with some mixed sedimentary material and aolian deposits with low to moderate erosion potential. Productivity of most soils is low.

Air Quality

Good visibility is a critical resource at Grand Canyon. The clarity of the air is essential to visitor enjoyment of major Park resources, and is a sensitive indicator for other air quality concerns. Grand Canyon National Park is a Federally designated Class I area under the Clean Air Act. This designation sets the most stringent limits on allowable increases in air pollution. It also sets a goal for removing any existing, and preventing any future, human-caused haze in the Park.

Various State and Federal agencies have studied air quality in the Park since 1959. Monitoring results have shown that air pollution impairs visibility to some extent 90% of the time. Some of this haze is the result of specific "point sources" of pollution, while much of the haze is regional in nature. The Navajo Generating Station (Page, Arizona) was identified as a point source that contributes to winter haze within the Canyon. As a result, the plant is installing sulfur dioxide scrubbers at a cost of about $500 million reduce its SO_2 emissions by 90%. The Department of the Interior certified the Mohave Power Project (Laughlin, Nevada) as another contributing source of haze in 1997. The U.S. Environmental Protection Agency (EPA) is considering potential remedial actions for that plant.

Regional haze, as its name implies, comes from many sources spread over a wide area. The Grand Canyon Visibility Transport Commission addressed haze at Grand Canyon and 16 other Class I areas on the Colorado Plateau. Its 1996 recommendations include strategies for dealing with point, area, and mobile pollution sources, wildland fire, international pollution transport, and other issues.

As part of the Grand Canyon Visibility Transport Commission process, an inventory of in-Park pollution sources was conducted. The inventory found mobile sources (vehicles and their associated road dust) to be the largest regular contributors to in-Park air pollution. Although the total contribution from all in-Park pollution sources to haze in the Grand Canyon was not determined, it was felt to be quite small.

Biotic Communities

The Grand Canyon region is one of the most ecologically diverse in North America. Plant communities vary from cool, moist subalpine forests and meadows between 8,000 and 9,000 feet elevation, to those of the hot, dry Great Basin, Sonoran, and Mojave Deserts. While the influence of microhabitats and site-specific factors are significant, vegetation is primarily controlled climatically, with precipitation, maximum summer and minimum winter temperatures interacting with elevation to distribute plants.

The Park contains 129 vegetation communities or formations generalized as riparian woodland and scrub, desertscrub, grassland, woodland, and forest. Sixty-three vegetation associations within these formations have been classified and mapped, and more than 1,500 known vascular plants species within an elevation difference of almost 8,000 feet have been documented. Approximately eight percent of the Park's floral species are exotic. The Park contains over a dozen exclusive endemic plants, with additional 23 regional endemics with ranges crossing Park boundaries.

A riparian community exists along the Colorado River and its perennial tributaries characterized by the exotic salt cedar (tamarisk), coyote willow, arrowweed, seep willow, western honey mesquite and catclaw acacia. Hanging gardens, seeps and springs contain many rare and unique plant and invertebrate species. Over 285 miles of the main Colorado River and its tributaries contain outstandingly remarkable characteristics, including native riparian plant communities, and these areas are identified as eligible for Wild and Scenic River designation. The construction of Glen Canyon Dam drastically altered the downstream riparian environment of the Colorado River in Grand Canyon.

Plant species with affinities to the four North American desert floras comprise the desertscrub communities. A Mohavean desertscrub extends along the inner gorge from the Grand Wash Cliffs in the extreme western Park to near the confluence of the Little Colorado River. It is typified by warm desert species including Sonoran and Chihuahuan varieties. Great Basin Desert species predominate in Marble Canyon and Tonto Platform vegetation.

Grassland communities in Grand Canyon are rare. The North Rim contains two types of mountain meadows: montane meadows and upland subalpine grasslands. Both are typified by a variety of grass species, with sedges in the wettest areas and forbs and grasses along the dry margins. Semi-desert shrub-grasslands occur at Toroweap Valley and above the Grand Wash Cliffs.

Woodlands of juniper and pinyon dominate above the desertscrub environment to about 6,200 feet elevation. Higher elevations produce ponderosa pine forests, and above 8,200 feet forests are characterized by Englemann spruce, blue spruce, Douglas fir, white fir, and aspen.

Special Status Species

Currently the century milk-vetch is the only Federally listed endangered plant in Grand Canyon. In addition, there are seven "Species of Concern," whose long-term viability is in question.

The Park provides habitat for seven endangered and threatened animals, including the bald eagle, peregrine falcon, Mexican spotted owl, southwestern willow flycatcher, humpback chub, razorback sucker, and the Kanab ambersnail. There are approximately 30 other Species of Concern including the northern goshawk, Navajo Mexican vole, and seven bats formerly listed as Category 2 species by the U.S. Fish and Wildlife Service (USFWS). These were the long-legged myotis, Townsend's big-eared bat, Allen's lappet-browed bat, big free-tailed bat, fringed myotis, western small-footed myotis, and the spotted bat. Abert squirrels are found on the South Rim and endemic Kaibab squirrels are present on the North Rim.

The only large mammalian predator surviving in Grand Canyon is the mountain lion. Black bears rarely enter the Park. The gray wolf, grizzly bear, and jaguar are extirpated. Bobcats are uncommon, but coyotes are ubiquitous. The larger prey species vary in abundance. Deer are the most common ungulate. Antelope can be found occasionally in open grasslands and pinyon-juniper rimlands. Desert bighorn can be frequently encountered throughout the inner canyon of the central and western Park.

Cultural Resources

Cultural resources of Grand Canyon include historic and prehistoric archaeological sites, cultural landscapes, historic buildings, trails, monuments, and traditional cultural properties. Within the proposed wilderness, archaeological and historic properties exist reflecting human use from the Archaic period nearly 4000 years ago to historic use related to early Park development and the Civilian Conservation Corps.

Although slightly more than two percent of Park lands have been inventoried for archaeological resources, over 3700 archaeological sites have been documented. The earliest evidence of human use of the Canyon comes from a Paleo-Indian projectile point fragment dated to over 10,000 years ago.

The next major indication of human use is found during the Archaic period, nearly 4000 years ago. Hunters and gatherers were using many Canyon and rim areas, at times leaving

artifacts known as split-twig figurines in isolated caves in the inner canyon. In addition to the figurines, distinctive rock art, projectile points, and limited physical remains such as hearths provide information of these archaic period peoples. Nearly continuous, albeit limited, occupation appears to have occurred from the archaic into the later Basketmaker and Pueblo periods by people known as ancestral Pueblo and Cohonina. Over a thousand places exist which document use from A.D. 800 to 1200. Use of the Canyon diminished after A.D. 1200, although strong evidence exists to document continuing use into protohistoric and historic times by the Cerbat (ancestors to today's Hualapai and Havasupai), Southern Paiute, Pueblo (Hopi and Zuni) and Navajo.

The proposed Grand Canyon wilderness contains significant historic resources, including constructed trails, tree towers that served as fire lookouts, and several historic cabins and shelters.

Recreation

In 1996, over 4.9 million visitors came to Grand Canyon National Park (National Park Service 1996). About 22% of the public visited during the spring, 48% during the summer, 22% during the fall, and 8% during winter. About 80% of visitors stay on the North and South Rims and do not venture below the rims. About 40% of the total come from other countries.

Annual wilderness use (not counting the Colorado River) exceeds 20,000 people, with over 100,000 user nights (defined as one person per night) documented. Permits are required for overnight use, and the demand for popular areas exceeds availability. Reservations, accepted up to four months prior to the start of a trip, are recommended. Recreational user fees include a $20 Basic Permit Fee plus a four-dollar per person per night impact fee. Requests for permits are accepted by mail, in person, or FAX, and are issued on a first-come, first-served basis.

IV. ENVIRONMENTAL IMPACTS

ALTERNATIVE A: PROPOSED ACTION

1. Natural Resources

This alternative consists of the management actions and associated monitoring procedures outlined in the Draft Wilderness Management Plan. It addresses specific elements of the natural environment including soils, air quality, flora, and wildlife including special status species through procedures including restoration and other impact mitigations, monitoring, research, and consistent application of the minimum requirement concept.

Restoration

This alternative establishes an active restoration program through development and implementation of action plans for rehabilitation of campsites and trails in the Horseshoe

Mesa, Hermit Creek, Monument Creek, and Upper Tapeats Use Areas. Once action plans are written and implemented, negative impacts to vegetation and soils should be significantly reduced. The Park should achieve similar benefits by establishing designated campsites and initiating rehabilitation efforts for impacted areas in the Deer Creek, Cape Final, Point Sublime, Fire Point, Swamp Point, and Pasture Wash Use Areas. Other areas requiring restoration or rehabilitation will be addressed in future action plans.

This alternative also calls for restoration to a natural condition of approximately 50 miles of primitive roads. The benefits of road restoration in remote locations includes a reduction of long-term environmental costs to the Park. Poorly located or unmaintained roads often result in serious erosional problems, including severe gully formation that negatively impact soils, vegetation, and other resources. This alternative calls for mitigation of impacts by developing and implementing a coordinated sequence of action plans designed to ultimately restore these areas to a natural condition.

This alternative will result in significant environmental benefits by:

- reducing vehicular destruction of biological resources including vegetation and microbiotic crusts
- impeding exotic plant invasion by restoring disturbed surfaces
- reducing the opportunity for illegal collection of rare plants and animals-minimizing habitat fragmentation caused by dissecting otherwise large patches
- reducing negative encounters between wildlife and humans, including exposure of large mammals such as deer, cougar and bighorn sheep to poaching and harassment.

Research

The proposed alternative encourages research that adds to an understanding of the Park and contributes to the body of knowledge required for effective management and protection of wilderness values. It expands the Park's research program to obtain accurate information about the Grand Canyon's resources, ecological processes and human influences.

This alternative also evaluates the tools and methods of scientific study for impacts on the character of the wilderness. It stresses the need to take reasonable efforts to minimize impacts while maximizing the benefit of scientific investigations by applying the minimum requirement decision process.

Ecosystem Management

The proposed alternative calls for the development of, through partnerships with adjacent land-management agencies, conservation organizations, and institutes of higher learning, an interagency ecosystem management strategy. This strategy will emphasize restoration and maintenance of natural processes and viable populations of all native species in natural patterns of abundance and distribution. The objectives of the program include 1) maintenance of long-term viable carnivore populations, 2) control of nonnative plant and animal species, 3) design and implementation of studies for the reintroduction of extirpated species, and 4) design and implementation of a wildlife conservation strategy. This

alternative initiates a long-term, ecosystem approach to preserving Park values.

Visitor and Staff Impact Mitigation

This alternative establishes a coordinated interpretive and educational program providing hikers adequate information for planning and executing an enjoyable and safe expedition. By emphasizing Leave No Trace minimum impact travel and camping techniques, it guides visitors on protecting wilderness resources and values.

This alternative also establishes a coordinated, interagency wilderness and minimum impact educational program for Park staff. This program includes 1) wilderness management principles and philosophy, 2) Leave No Trace training, 3) application of the minimum requirement concept, 4) development of proficiency in the use of primitive tools, 5) development of minimum impact trail maintenance techniques and fire suppression tactics, and 6) development of wilderness safety practices. This program will facilitate minimal impacts to Park resources resulting from administrative activities.

Wild and Scenic Rivers

This alternative calls for conducting an inventory of all tributary streams to quantify flow data and riparian vegetation. It provides for adopting methods for determining suitability of the Colorado River and its tributaries for inclusion in the National Wild and Scenic Rivers System, ultimately providing an additional protective layer for these rare, intact environments.

Monitoring

Implementation of proposed resource monitoring, and subsequent implementation of management actions, if conditions deteriorate below standards established in the Wilderness Plan [Chapter 12], should assure perpetuation of desired ecological conditions.

This alternative's requirement to conduct water quality and flow data monitoring at wilderness springs on a cyclic basis should result in improved protection of these resources.

Minimum Requirements

In addition, rigorous adherence to the minimum requirement concept should perceptively reduce the likelihood of impacts on Park resources resulting from unnecessary mechanized use or other highly manipulative activities.

2. Cultural Resources

The restoration of 50 miles of primitive roads in remote locations will reduce long-term environmental costs to the Park. Poorly located or unmaintained roads often result in serious erosional problems, including severe gully formation, that negatively impact archaeological resources. This alternative calls for mitigation of impacts by developing and implementing a coordinated sequence of action plans. In addition, reducing vehicular access will discourage

illegal excavation and collection of archaeological resources.

A determination of eligibility for the National Register of Historic Places for the Santa Maria Springs Shelter, Signal Hill Firetower, Kanabownits Cabin, and the Kanabownits Firetower will contribute to long-term protection of these significant historic resources.

Conducting archeological surveys and monitoring along popular trails and campsites in the Grandview Complex, Hermit–Monument Complex, and Thunder River–Deer Creek Complex will provide essential information required for protecting cultural features.

Developing and implementing a site data recovery plan for archeological sites located in the Hermit Creek, Monument Creek, Horseshoe Mesa, Cottonwood Creek, Clear Creek, Cremation, and Tanner Use Areas will contribute to the long-term understanding of these areas.

Developing and implementing action plans for the Tanner, New Hance, South Bass, South Canyon, and Nankoweap Trails will help protect their historic integrity.

Continuing surveys, assessment, monitoring, and when necessary mitigation of problem segments of other wilderness trails will protect these important resources.

3. Visitor Use

This alternative provides for wilderness hiking, skiing, snowshoeing, caving, climbing, camping and other wilderness-dependant activities within the Park's 1.1 million acres of proposed wilderness. Opportunities include hiking 63 trails (approximately 400 miles) as well as exploring cross-country though a variety of terrain and environments.

The proposed alternative establishes a coordinated interpretive/educational program to provide hikers adequate, relevant information for planning and executing an enjoyable and acceptably safe expedition, whether hiking for a day or for an extended period, and to conduct themselves in a manner not damaging to wilderness resources and values. It also provides, through partnerships with adjacent land-management agencies, information on wilderness and nonwilderness recreational opportunities on adjacent lands, including National Forest Service, Bureau of Land Management, State, and Tribal lands.

The proposed action continues a permit system that serves the visitor by providing the opportunity to obtain permits for wilderness and nonwilderness areas that yield the type of experience they seek. It also establishes a cooperative permitting system for use on Tribal and Park lands.

Grand Canyon wilderness and backcountry consists of five "Opportunity Classes," which describe a range of desired resource, social and managerial conditions. Sociological standards describe the acceptable number and duration of contacts an overnight user may have while hiking or camping. The implementation of the proposed sociological monitoring, and subsequent implementation of management actions if conditions deteriorate below standards established in the Wilderness Plan (Chapter 12), should assure perpetuation

of desired experiential opportunities.

Rigorous adherence to the minimum requirement concept should perceptively reduce the likelihood of negative impacts on visitor experience. These impacts would otherwise result from unnecessary mechanized administrative use, or other highly manipulative administrative activities.

Recreational Stock Use

The opportunity to enjoy mule and horseback riding will be retained, although at reduced levels. This alternative identifies eight wilderness trails (approximately 50 miles), all rim lands except the Whitmore Trail, and an additional 65 miles of primitive road, as available for recreational stock (horses, burros or mules) use. These areas were historically available for stock at assumed low use levels. An additional 50 miles of primitive roads previously available for stock use will be converted to a natural condition. Hundreds of miles of similar primitive roads available on adjacent Federal and Tribal lands provide ample opportunity for this type of recreation.

Due to the current low hiker use and remote nature of the proposed stock trails, visitor conflict inherent in hiker-stock interactions should remain low. The exception may be the Tiyo Point Trail, although ten other Park trails (approximately 49 miles) in similar habitat are available for exclusive hiker use.

The management of the nonwilderness Bright Angel, North Kaibab and South Kaibab Trails is addressed in the 1988 Backcountry Management Plan. That document remains the primary management plan for the Cross-Canyon Corridor until replaced by an updated plan.

Semi-Primitive Mechanized Access

An additional 50 miles of primitive roads will be converted to a natural condition, although approximately 65 miles, outside of wilderness, will be retained for mechanized use in conifer and woodland environments. Hundreds of miles of similar primitive roads available on adjacent Federal and Tribal lands provide ample opportunity for this type of recreation. The preferred action will eliminate the opportunity to drive to five scenic overlooks; however, ten primitive roads to Park scenic overlooks will be retained. In addition, at least 15 additional primitive roads on adjacent lands provide access to scenic vistas of the Grand Canyon. This alternative provides significant opportunities for enjoying spectacular vistas in a primitive setting.

4. Administration and Costs

This alternative enhances protection of wilderness values, such as soils, vegetation, and cultural resources, by providing continuity of management throughout changes of Park administration and staff. It recommends Park staffing levels to ensure that wilderness management responsibilities are met in accordance with the NPS Wilderness Management Guidelines.

This alternative serves Park management by providing data on hiker use levels and distribution in order to make informed decisions regarding the management and protection of backcountry and wilderness resources.

It also identifies the need to conduct cyclic maintenance and restoration on wilderness trails to protect natural and cultural resources. Funding, either through base funding increases, partnerships, cost recovery initiatives, or grants, will be pursued.
Restoration of 50 miles of primitive roads in remote locations will reduce future long-term maintenance costs to the Park. Developing and implementing a primitive road program meeting the minimal standards (as well as restoration requirements) identified in the Proposed Alternative will require funding above current levels.

Minimum Requirement Concept

This alternative directly addresses the "minimum requirement concept" for administrative use in Grand Canyon National Park. The minimum requirement consists of the minimum tool or administrative practice necessary to successfully and safely accomplish management objectives with the least adverse impact on wilderness character and resources. *NPS Management Policies* clearly states that "all decisions pertaining to administrative practices and use of equipment in wilderness will be based on this…. Potential disruption of wilderness character and resources and applicable safety concerns will be considered before, and given significantly more weight than, economic efficiency."

This alternative requires a review of all administrative practices, including river and fire management activities. It also, reiterating management objectives defined in the 1995 General Management Plan, requires subsequent revisions of management plans affecting wilderness resources to conform with the minimum requirement concept. Since the minimum requirement review will be part of the normal management planning process, additional costs relating to planning for minimum requirement should be inconsequential.

Implementing minimum requirement may result in additional costs to field operations:

- maintenance costs in wilderness will result in greater time spent in reaching remote work sites. However, careful project scheduling should allow continued administrative presence at costs comparable to current
- the Fire Management program will be evaluated as part of the Fire Management Plan revision process. At that time any additional costs in equipment, time, and personnel will be better understood
- the River District's routine patrols generally rely on motorized watercraft. Compliance with minimum requirement may require a primarily non-motorized program. Trip and participant scheduling, and reliance on kayak as well as raft-supported patrols, should allow continued presence at comparable levels with comparable costs to Park administration.

This alternative establishes a coordinated, interagency wilderness and minimum impact educational program for Park staff. This program includes 1) wilderness management principles and philosophy, 2) Leave No Trace training, 3) application of the minimum

requirement concept, 4) development of proficiency in the use of primitive tools, 5) development of minimum impact trail maintenance techniques and fire suppression tactics, and 6) development of wilderness safety practices. Although adding to Park administrative costs, this program will help assure minimal impacts to Park resources resulting from administrative activities.

5. Actions Affecting Other Plans and Documents

River and Fire Management Plans

Planning revisions either underway or expected in the near future include the Colorado River Management Plan and the Fire Management Plan. These are major implementation plans whose scope of activities affect a broad range of park resources. The proposed action requires a review of all administrative practices, including river and fire management activities. This alternative also, reiterating management objectives defined in the 1995 General Management Plan, requires subsequent revisions of management plans affecting wilderness resources to conform with the minimum requirement concept. By providing specific direction for revising other Park management plans, this alternative assures consistency in the application of wilderness requirements to the full spectrum of management actions.

Wilderness Recommendation

Implementation of the Proposed Action will require an amendment to the 1993 Wilderness Recommendation. The proposed alternative initiates management actions that maintain or restore wilderness suitability of areas identified in the Final Wilderness Recommendation (1980; 1993). It modifies, but does not diminish, that Recommendation in two regards. First, it designates the old "Kanabownits," or W-4, road as the nonwilderness, mechanized route to Point Sublime. The route specified in the Wilderness Recommendation was W-1, extending from the North Rim dump to its junction with W-4 (the Point Sublime Road). W-1 will be converted to the Basin Trail. Closing W-1 to mechanized access allows restoration of severe vehicular impacts in "The Basin," the largest meadow in Grand Canyon National Park, while providing mechanized access to Point Sublime, as specified in the Final Wilderness Recommendation.

The second modification of the Final Wilderness Recommendation changes the so-called "Toroweap Point Overlook" primitive road to the Brady Hollow Trail. This route is located on the Kanab Plateau, and should not be confused with the popular Toroweap overlook road at Tuweep. Although the Wilderness Recommendation provides for retaining a nonwilderness corridor to Toroweap Point, the existing road is severely damaged in numerous locations and fades completely before reaching any vista. Meeting the Recommendation's criteria would require significant new construction (one to several miles, depending on site selection) and substantial repair. Access, either by horseback or hiking, is still available under the proposed alternative.

ALTERNATIVE B: NO ACTION

This alternative continues actions based on the 1988 Backcountry Management Plan and would not provide for wilderness management. The 1988 Backcountry Management Plan predates the 1995 General Management Plan and consequently lacks that document's clear direction and wilderness protection language. This alternative does not address maintaining and restoring wilderness suitability of areas identified in Grand Canyon National Park's Wilderness Recommendation. While the Backcountry Plan reiterates *NPS Management Policies*' requirement to maintain wilderness suitability, it does not provide general philosophical nor day-to-day guidance regarding wilderness management. Under the 1988 plan, management actions necessary to implement the full range of wilderness management policies for the proposed wilderness in Grand Canyon National Park would not occur.

1. Natural Resources

Restoration

This alternative does not address the issue of maintaining and restoring wilderness, including the conversion to trails or the restoration to a natural condition of approximately 130 miles of primitive roads. The benefits of road restoration in remote locations are not identified. Poorly located or unmaintained roads often result in serious erosional problems, including severe gully formation that negatively impacts soils, vegetation, and other resources. This alternative does not provide mitigation of these long-term impacts by restoring these areas to a natural condition. These impacts include:

- vehicular destruction of biological resources including vegetation and microbiotic crusts
- continuation of exotic plant invasion
- illegal collection of rare plants and animals
- habitat fragmentation caused by dissecting otherwise large patches
- negative encounters between wildlife and humans, including exposure of large mammals such as deer, cougar and bighorn sheep to poaching and harassment.

Research

This alternative neither encourages nor discourages research that adds to an understanding of the Park and contributes to the body of knowledge required for effective management and protection of wilderness resources and values. It does not address expansion of the Park's research program to obtain accurate information about Grand Canyon's resources, ecological processes and human influences.

This alternative does not evaluate the tools and methods of scientific study for impacts on the character of the wilderness. It does not address the need to take reasonable efforts to minimize impacts while maximizing the benefit of scientific investigations through application of the minimum requirement decision process.

Ecosystem Management

This alternative does not address an interagency ecosystem-management strategy. This omission will result in substantial, although currently unquantified, negative impacts to wilderness resources.

Visitor and Staff Impact Mitigation

This alternative continues the current limited educational program providing hikers information for planning and executing an enjoyable and safe hike. Providing a higher level of hiker awareness, such as through the Leave No Trace program, is not addressed. Negative impacts are assumed to be greater under this alternative.

This alternative does not establish a coordinated, interagency wilderness and minimum-impact educational program for Park staff. It does not provide staff training in wilderness management principles and philosophy, Leave No Trace training nor the application of the minimum requirement concept. This alternative does not assist in developing proficiency in the use of primitive tools nor minimum impact trail maintenance. The development of wilderness safety practices is not discussed. Unlike the proposed alternative, this alternative fails to facilitate minimal impacts to Park resources which currently result from administrative activities.

Wild and Scenic Rivers

This alternative does not address conducting an inventory of all tributary streams to quantify flow data and riparian vegetation. It does not adopt methods for determining suitability of the Colorado River and its tributaries for inclusion in the National Wild and Scenic Rivers System, forgoing an additional protective layer for these rare, intact environments.

Minimum Requirements

Adherence to the minimum requirement concept is not discussed. Impacts on Park resources resulting from unnecessary mechanized use or other highly manipulative activities is not addressed.

2. Cultural Resources

This alternative does not call for a determination of eligibility for National Register of Historic Places for the Santa Maria Springs Shelter, Signal Hill Firetower, Kanabownits Cabin, nor the Kanabownits Firetower. It does not address the long-term protection of these significant historic resources.

This alternative does not call for conducting archeological surveys and monitoring along popular trails and campsites in the Grandview Complex, Hermit–Monument Complex, and Thunder River–Deer Creek Complex. It will not provide essential information required to protect cultural features.

This alternative does not provide for developing and implementing a site data recovery plan for archeological sites located in the Hermit Creek, Monument Creek, Horseshoe Mesa, Cottonwood Creek, Clear Creek, Cremation, and Tanner Use Areas. It will not contribute to the long-term understanding of these areas.
This alternative does not call for the restoration of 50 miles of primitive roads in remote locations. Long-term environmental costs to the Park will continue, and poorly located or unmaintained roads will result in serious erosional problems, including severe gully formation that negatively impact archaeological resources. In addition, vehicular access will continue to encourage illegal excavation and collection of archaeological resources.

3. Visitor Use

This alternative provides for wilderness hiking, skiing, snowshoeing, caving, climbing, camping and other wilderness-dependant activities within the Park's 1.1 million-acre proposed wilderness. Opportunities include hiking 63 trails (approximately 400 miles) as well as exploring cross-country though a variety of terrain and environments.

The No Action alternative continues a limited educational program to provide hikers information for planning and executing an enjoyable and acceptably safe expedition, whether hiking for a day or for an extended period. It provides limited information on how hikers can conduct themselves in a manner not damaging to wilderness resources and values. It does not provide information on wilderness and nonwilderness recreational opportunities on adjacent lands.

The implementation of the proposed sociological monitoring, and subsequent implementation of management actions if conditions deteriorate below standards established in the Backcountry Plan, is addressed and should result in maintaining desired experiential conditions.

Failure to address the minimum requirement concept would perpetuate the likelihood of negative impacts on visitor experience resulting from unnecessary mechanized use and other highly manipulative administrative activities.

<u>Recreational Stock Use</u>

The opportunity to enjoy mule and horseback riding would be retained. Seven wilderness trails (approximately 50 miles) identified for stock and hiker use would be shared with mechanized vehicles. An additional 50 miles of primitive roads, planned for conversion to natural conditions in the Proposed Alternative, would continue to be available for stock use.

4. Administration and Cost

This alternative does not assure protection of wilderness values by providing continuity of management throughout changes of park administration and staff. It does not recommend Park staffing levels needed to ensure that wilderness management responsibilities are met in accordance with the NPS Wilderness Management Guidelines.

This alternative serves Park management by providing data on hiker use levels and distribution in order to make informed decisions regarding the management and protection of backcountry and wilderness resources.

Because it fails to provide specific direction for revising other Park management plans, this alternative does not assure consistency in the application of wilderness requirements to the full spectrum of management actions. Planning revisions either underway or expected in the near future include the Colorado River Management Plan and the Fire Management Plan.

Minimum Requirement Concept

This alternative does not address the "minimum requirement concept" for administrative use in Grand Canyon National Park. The minimum requirement consists of the minimum tool or administrative practice necessary to successfully and safely accomplish management objectives with the least adverse impact on wilderness character and resources. This alternative is not consistent with *NPS Management Policies*, which clearly states that "all decisions pertaining to administrative practices and use of equipment in wilderness will be based on this concept."

Unlike the Proposed Action, this alternative does not establish a coordinated, interagency wilderness and minimum impact educational program for Park staff. Avoidable impacts on wilderness resources, including visitor experience, would continue.

VI. CONSULTATION AND COORDINATION

Tribal Consultation

All eight affiliated tribes were contacted to initiate formal consultation with Grand Canyon National Park. Park staff met with the following responding Tribes. Comments were incorporated into the draft Plan:

- Navajo Nation
- Hualapai Tribe
- Hopi Tribe
- Havasupai Tribe

Public Input

Written comments were received during a public scoping period from June through August, 1995. Issues and comments are addressed in appropriate sections of the draft Plan.

Other Agencies and Offices

- U.S. Forest Service: Kaibab National Forest, North Kaibab District

- Bureau of Land Management: Arizona Strip District
- National Park Service: National Wilderness Steering Committee
- Arthur Carhart National Wilderness Training Center (USFS, BLM. NPS, USFWS)

Grand Canyon National Park Staff

- Wilderness District
- Backcountry Permits Office
- North Rim District
- Fire and Aviation Management
- Concessions Management
- Interpretation and Education
- Roads and Trails Management
- Science Center

Prepared by Kim Crumbo, Wilderness Coordinator, Grand Canyon Science Center